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AUTHOR Raphael, Dennis
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ABSTRACT

Two student populations of 13-year-olds in Ontario (Canada) were assessed as part of the 1988 International Assessment of Educational Progress (IAEP): French- and English-language students. Results confirm findings of differences in mathematics achievement seen earlier in the Second International Mathematics Study. Ontario French-language students performed poorly in relation to students in the other Canadian provinces. Unlike the earlier study, however, problems with translation and generalizability of results were not apparent. Analysis of the item-by-item data identified mathematics and science achievement differences between the French- and English-language populations in Ontario and between Ontario French-language and Quebec French-language students. The item response theory scaling procedure made presentation of both the results and the meaning of these results accessible to policymakers, educators, and the public. The complementary nature of the IAEP and the Ontario Provincial Review Program is noted, and recent initiatives by the Ontario Ministry of Education addressing French-language education are discussed. Two bar graphs and one data table are included. (Author/TJH)

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Dennis Raphael

Ontario Ministry of Education
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900 Bay Street
Toronto, Ontario M7A 1L2

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Abstract

Ontario assessed two student populations of 13 year olds as part of IAEP: French-language and English-language students. Results confirmed findings of differences in mathematics achievement seen earlier in the Second International Mathematics Study. Unlike the earlier study however, problems with translation and generalizability of results were not apparent.

Analysis of the item by item data identified mathematics and science achievement differences between the French and English-language populations in Ontario and between Ontario French-language and Quebec French-language students. The IRT scaling procedure made presentation of both the results and the meaning of these results accessible to policy makers, educators, and the public.

The complementary nature of the IAEP with the Ontario Provincial Review Program was discussed and recent initiatives by the Ontario Ministry of Education which address French-language education were presented.

The Ontario Education System

Ontario, with a population of approximately 9 million has the largest population of the ten Canadian provinces. Almost two million children (1,878,000) attend school and there are approximately 102,000 13-year-olds.

Enrollments in publicly funded schools (public and Roman Catholic Separate) account for 97 percent of the school population for ages 6 to 16. Catholic schools educate about one-third of these students. Five percent of the population ages 6 to 15 attends French-language schools, and the great majority of these schools are part of the Separate school system.

In Canada, education is a provincial responsibility. The Ontario Ministry of Education issues official curriculum guidelines and lists of approved textbooks but the system allows significant discretion to local school boards to determine specific curriculum content and instructional methodology.

No formal streaming or tracking is provided through eighth grade, but students are expected to choose either the advanced (university-bound), general, or basic level for their ninth-grade courses. Most students in grade 8 are found in K-8 elementary schools. Students can obtain a secondary-school diploma following completion of 30 credits. Each credit involves 100 to 120 hours of instruction; 16 credits are compulsory for most students. Students wishing to attend university must take six credits at the academic course level (formerly grade 13).

Provincial Assessment

Prior to 1968, the Ministry of Education administered province-wide examinations as a basis for awarding the grade 13 diploma. These examinations were replaced in 1968, for postsecondary admission purposes, by the Ontario Test for Admission to College and University. These tests were subsequently discontinued in 1974.

Since the ending of these assessments there has been increasing concern about standards in the province. Most recently two government-initiated reports were critical of achievement levels obtained by students (e.g. Radwanski, 1988) and a Select Committee of the Ontario Legislature has been established to examine the goals and purposes of education. These increasing concerns about levels of achievement contributed to Ontario's involvement in the IEA mathematics and science studies and the IAEP involvement. It was during the IEA mathematics study that the Franco-Ontarian achievement issue began to emerge.

The SIMS and Franco-Ontarian Achievement

Ontario participated in the IEA Second International Mathematics Study (SIMS) during the 1981-1982 school year. Ontario's sample at the Grade 8 level consisted of 130 schools of which ten were French-language. (This does not refer to French immersion classes which are considered English-language.) Ontario's Grade 12/13 sample consisted of only 5 French-language secondary schools. (There are approximately 250 French-language elementary schools (K-8) and about 40 French-language secondary schools in Ontario.)

Student achievement of the French-language students in the Ontario Grade 8 sample, as compared to student achievement among English-language students, was poor (McLean, Raphael, and Wahlstrom, 1983) and is presented in the first figure. No reliable differences were seen at the secondary level between French and English language schools.

While the French-language sample was small, the magnitude of the French-English language differences suggested some cause for concern. Before the final Ontario SIMS report was finished however, criticism was published concerning the quality of the translation (Hanna and Ladouceur, 1986) and though 130 of the 180 items had not been criticized and some of the problems were relatively minor (McLean, Raphael, and Wahlstrom, 1985), these translation concerns led to the comparative data being deleted from the final report (McLean, Raphael, and Wahlstrom, 1986).

[Simon (1987) conducted an elaborate analysis of item bias of the Ontario English and French-language data using five statistical techniques --psuedo-IRT, Mantel-Haenszel, iterative logit procedure, partial correlation method and full chi-square approach-- and found that while all the methods except the partial correlation significantly correlated with each other, results of these analyses did not agree in number, degree, or direction of item bias with the subjective judgments of bias made by experts.]

A generalizable sample of French schools was not chosen in Ontario for the SISS.

IAEP Involvement and the Examination of Ontario Student Achievement

Ontario's involvement in the International Assessment of Educational Progress provided then, the first real comparative data concerning English and French-language student achievement in the province. (As will be noted later, subsequent data from the Ontario Provincial Reviews confirmed somewhat the English French-language performance difference in science.)

Generalizable samples of both language groups were chosen in Ontario, New Brunswick, and Quebec, and the combined resources of the three provinces' Ministries of Education allowed for a "fool-proof" translation of the items into French. Every item was seen as relevant to the curriculum and these validity checks were extensive and repeated. The outcomes of the analyses were awaited with some anticipation.

French and English-language IAEP Results in Ontario

As data cleaning began in May 1988, preliminary analysis of the item by item data confirmed suspicions concerning French and English-language performance in Ontario. In mathematics, the mean difference across the initial 69 items in the assessment (these included some SIMS items) favored the English-language sample by 8.9 percentage points. English-language students outperformed French-language students on 64 items, the samples tied on one, and French-language students outperformed English-language students on four items. The largest of the French-language over English-language difference was five percentage points while 14 items favored the English-language sample by at least 15 percentage points.

In science, the average English-language over French-language difference was 7.6 percentage points for the initial 66 items. English-language performance was higher for 54 items, while French-language scored higher on 12. The strongest French-language item favored students by 14 percentage points while 12 items favored English-language students by at least 15 percentage points.

Another check of the translations by curriculum experts confirmed that the translations were accurate and were probably not the source of the French English-language differences in achievement. Additionally, hypotheses were advanced concerning the causes of these discrepancies. Some of these reasons are outlined in subsequent sections.

French and English-language Results in the Other Provinces

The receipt of the item by item results from the other Canadian provinces in September 1988 confirmed that Ontario French-language students had indeed performed poorly in relation to students in the other Canadian provinces. (Much solace was not taken in knowing that Ontario French-language students had performed as well as American students.) At the Ministry of Education actions were formulated to deal with the results as the results of the IRT were awaited.

The IRT Scaling and the IAEP Final Report

By the time the results of the final IRT scaling were received the scope of the problem had been seen and the production of overall proficiency scores provided a means of presenting the results (the mathematics results are presented in this paper) in a clear, concise manner to the policy makers, educators, and the public. While the rankings (Figure 1.1) basically replicated the mean percentage correct analyses, the proficiency levels and the percentages of students associated with each (Table 1.1) were particularly helpful in describing what these results meant.

Follow-Up and the Identifying of Specific Problem Areas

The follow-up to the IAEP involvement involves a variety of government initiatives and the use of the Provincial Review Program to focus on aspects of French-language education.

Government Initiatives

Ontario's commentary in the international report, A World of Differences (Lapoint, Mead, and Philips, 1989) pointed out that: "Financial and legal recognition of French-language schools has a short history in Ontario. There continues to be a shortage of French-language educational resources and the relatively small percentage (5%) and the wide dispersion throughout the province of the francophone community contributes to the difficulty of meeting the educational commitment to French-language education."

The Ministry has announced the following initiatives related to French-language education:

Renouveau en enseignement de mathématiques (REMA) and Renouveau en science élémentaire (RESEL) are ministry-supported projects designed to provide French-language elementary school teachers with local professional development and curriculum resources in mathematics and science.

The Ministry's French-Language Fund for the Development and Production of Learning Materials is giving priority to resources in the areas of mathematics and science. The same applies for the development of computer software.

Recent legislation and Ministry policies have now given Franco-Ontarians more autonomy than previously in the identification of their needs and in the decision-making with regard to the most efficient use of their allocated resources.

Additionally, there are plans to develop an action plan in consultation with the French-language associations and faculties of education for systematic focussed teacher training and development of materials in mathematics and science.

Provincial Review Program

In 1987, Ontario initiated a provincial review process which provides information on curriculum implementation and student achievement (Raphael, 1987). Through the use of school-based multiple matrix item sampling, provincial levels of student achievement are obtained in the areas of science, mathematics, and first language.

Teacher and school information, including student opportunity-to-learn data, are also collected. A pilot review of Canadian Studies Geography at grades 9 and 10 was conducted in 1986-1987 (Cussons, Morrow, and Raphael, 1988 a,b), and grades 11 and 12 advanced-level Chemistry and Physics followed in 1987-1988 (McTavish, Morrow, and Raphael, 1989 a,b; Wrigglesworth, Morrow, and Raphael, 1989 a,b). During the 1988-1989 school year, provincial reviews of grade 6 Reading and Mathematics are being conducted. The review process operates on a five-year cycle, assessing one subject area at three levels each year. Samples representative of both English and French-language students are chosen. Boards have the option of joining the review and these boards receive detailed reports as does each participating school.

In the recent Senior Division Chemistry and Physics review (grades 11 and 12) reliable French and English differences emerged similar in magnitude to that seen in IAEP (McTavish, Morrow, and Raphael, 1989 a,b; Wrigglesworth, Morrow, and Raphael, 1989 a,b). However, since the provincial review uses a greater number of items then did IAEP (about 100 in each area of Chemistry and Physics, and five extended response questions requiring elaborated answers and work in each subject) and collects very detailed teacher and school level data, more elaborate analysis can identify possible sources of the English French-language differences. No scaling is done of these data.

IAEP and Provincial Reviews

These provincial reviews however do not provide comparative data from other provinces and are relatively expensive and elaborate undertakings. The reaction to the IAEP comparative French language data from other Canadian Provinces has stimulated discussion and reflection within the province.

These projects then can be seen as complementary. The IAEP provides reliable and valid data concerning system functioning. IAEP provides an impetus, as do the provincial reviews, for discussion, analysis, and if necessary, reform of educational practice in the province. IAEP findings promote support for the purposes of the newly developed provincial review program. In the case of French-language education it provides support for recent government initiatives.

Analytically, the Provincial Reviews delve further into the sources of these findings. Reviews are more encompassing and collect a variety of data at different levels: school, board, and province.

The Future of Interprovincial and International Assessments

Ontario expects to continue its involvement with IAEP. Ontario is also involved with the other Canadian provinces and territories in a program of developing Canadian national indicators as part of a initiative by the Council of Ministers of Education, Canada and is continuing its involvement with the OECD Educational Indicators Project.

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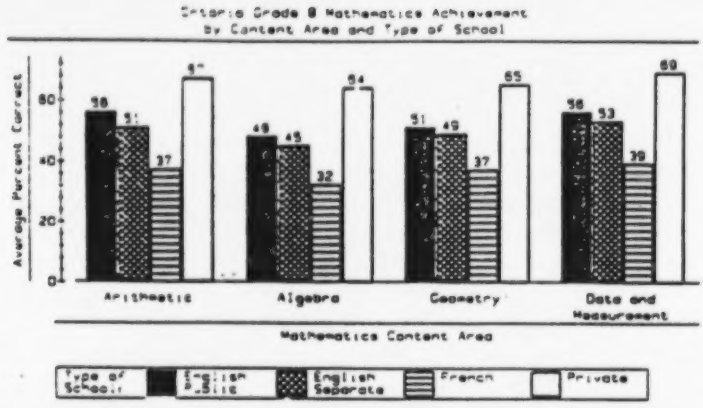
SIMS

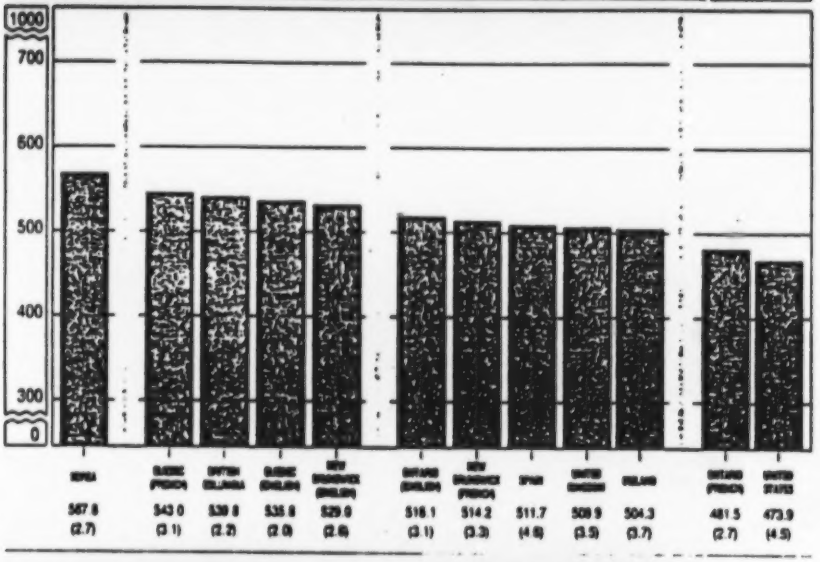


IAEP

FIGURE 1.1

Average Mathematics Proficiency, Age 13*

IAEP '88



IAEP

TABLE 1.1

Percentages Performing At or Above Each Level of the Mathematics Scale, Age 13*

IAEP '88

LEVEL 9	Add and Subtract 300	Simple Problems 400	Two-Step Problems 500	Understand Concepts 600	Interpret Data 700
Korea	100	95	78	40	5
Quebec (French)	100	97	73	22	2
British Columbia	100	95	69	24	2
Quebec (English)	100	97	67	20	1
New Brunswick (English)	100	95	65	18	1
Ontario (English)	99	92	58	16	1
New Brunswick (French)	100	95	58	12	<1
Spain	99	91	57	14	1
United Kingdom	98	87	55	18	2
Ireland	98	86	55	14	<1
Ontario (French)	99	85	40	7	0
United States	97	78	40	9	1

*Jackknifed standard errors for percentages range from less than 1 to 2.4 and are provided in the Data Appendix.